



Patent Application

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Patent Specification

Abstract

Abstract

The present invention relates to the lithium polymer secondary battery in which the structure of terminal is improved.

The present invention is to provide the anode terminal as to the prismatic type secondary battery, placing separator in interval and in which the anode plate and negative plate include the battery cell, the case sealing the battery cell hermetically, and the anode terminal for connecting the anode plate to the external circuit and the cathode terminal for connecting the negative plate to the external circuit and cathode terminal is the respective arranged lithium polymer secondary battery in the respective other side of the case. The battery cell by turns is laminated.

Representative Drawing

Drawing 1

Specification

Title of Invention

Lithium polymer secondary battery{Lithium polymer secondary battery}

**Brief Description of the Drawings**

Figure 1 is a summary isolation perspective view of the lithium polymer secondary battery according to one side of the present invention.

Fig. 2 schematically shows the plane view of the lithium polymer secondary battery of fig. 1.

The figs. 3a through 3h shows in order to explain the manufacturing process of the lithium polymer secondary battery according to one side of the present invention.

The figs. 4a through 4d schematically shows the plane view of the lithium polymer secondary battery according to another preferred embodiment of the present invention.

Fig. 5 schematically shows the plane view of the conventional lithium polymer secondary battery.

The simple description > of the denotation about the main part of < drawing.

10,110. Lithium polymer secondary battery. 11,111. Case.

11a. Lower case. 11b. Cover.

12. Receiving portion.

20,120. Battery cell. 21. Anode plate.

22. Negative plate. 23,49. Separator.

25. Cathode tab. 27. Cathode tab.

29,119. Anode terminal. 31,117. Cathode terminal.

33. First junction. 35. The second junction.

41. Current collector. 43. Electrode active material layer.

45. Electrode tap. 47. Electrode plate.

The Detailed Description of Invention**The Purpose of Invention****Field of Invention and the Prior Art**

The present invention relates to the secondary battery, more particularly, to the lithium polymer secondary battery in which the structure of terminal is improved.

According to the shape of the instrument which need the lithium secondary battery is the DC power supply, the shape of the various can be manufactured with the shape of the various. But the shape is manufactured with cylindrical, and button or the angular type. Here, the angular type LPB includes the battery cell and case, where the anode terminal and the cathode terminal having the fixed length one side of each anode plate / negative plate is extended to the cathode tab / cathode tab the battery cell is the structure which places separator in interval and in which the anode plate and negative plate are laminated welds. It connects with the external circuit and the anode terminal and cathode terminal supply the power. And the battery cell is inserted into the case of the square shape for example and it is sealed and the case is manufactured.

Fig. 5 schematically shows the plane view of the conventional lithium polymer secondary battery. As shown in Figure 5, it is sealed up in the battery cell (120) silver case (111). It connects in the same side of the case (111) by the medium of the anode terminal (119) and cathode terminal (117) with the external circuit.

In this way, as shown in Figure 5, the conventional secondary battery, especially, the anode terminal (119) and cathode terminal (117) of the lithium secondary battery are arranged in the same side of the case (111). The inter-terminal short circuit is caused although this kind of battery is according to due to the carelessness of little. To prevent this problem, the suitable attention has no choice but to be concentrated to the handling.

In the structure of this kind of battery, in case of will being broad, the big problem will not become enough interval between the cathode terminal and the anode terminal. But whether it is giddy with the link for the realization of the short bamboo flute frivolity of battery or not is miniaturized by more and more. As the inter-terminal interval becomes narrow as interval between the cathode terminal and the anode terminal become more and more narrow, the possibility that the inter-terminal short circuit is generated cannot help being enlarged. The factor which hinders the material flow since needing the suitable attention of the handling for inducing the loss of the material according to the short circuit of inter-terminal and preventing the inferiority by the short circuit of inter-terminal becomes as to this.

Moreover, the structure itself is very pliable and LPB can enhance the levity of shape. But shape has the most big element deciding on the shape in the location of the terminal. But when LPB having the structure of being restrictive by the terminal like convention is employed in the , cellular phone or camcorder, and the electronic apparatus like notebook, it consists of the factor limiting the outer shape of the electronic apparatus which employs whether it limps or not.

**Technical Problems to be solved by the Invention**

It is an object of the present invention to provide the lithium polymer secondary battery which to solve problems described in the above, designs, and in which the reliability is improved as to production and handling by improving the layout structure of the cathode terminal and the anode terminal electrically connected with the external circuit.

The Structure and Function of the Invention(Device)

To solve problems described in the above, the lithium polymer secondary battery according to the preferred embodiment of the present invention provides the anode terminal as to the lithium secondary battery, placing separator in interval and in which the anode plate and negative plate include the battery cell, the case sealing the battery cell hermetically, and the anode terminal for connecting the anode plate to the external circuit and the cathode terminal for connecting the negative plate to the external circuit and cathode terminal is the respective arranged battery in the other side of the case. The battery cell reciprocally is laminated.

Hereinafter, concretely the embodiment of the lithium polymer secondary battery according to attached one side of the present invention tries to be illustrated.

Fig. 1 schematically shows the isolation perspective view of the lithium polymer secondary battery according to a preferred embodiment of the present invention.

As shown in the figure, the lithium polymer secondary battery (10) provides the case (11) in which the battery cell (20) and the receiving portion (12) in which the battery cell (20) is inserted are formed.

The battery cell (20) has the structure of the electrode plate, coated with the electrode active material that is, the anode plate (21) and negative plate (22) placing the separator (23) in interval and being laminated.

A part of the anode collector (non illustration) is extended and one side of each anode plate (21) is comprised the cathode tab (25). A part of the cathode collector (non illustration) is extended and the cathode tab (27) is formed one side of each negative plate (22). Here, in the side of the cathode tab (27) silver case (11), it is arranged in the side and the other side of the cathode tab (25).

It each welds in the anode terminal (29) and the cathode terminal (31) having the respective fixed length and the electrode tap, that is, the cathode tab (25) and cathode tab (27) connect with the external circuit.

And it is made of the cover (11b) for shutting lower case (11a) and this having the receiving portion (12) in which the case (11) the battery cell (20) is inserted tightly.

The lower case (11a) and cover (11b) have the section structure (non illustration) in which the heat-adhesive substance is mutually stucked on the phase / lower-part of the respective aluminum foil. After the battery cell (20) is inserted, it is thermally fused and the first junction (33) and the second junction (35) prepared in the cover (11b) are sealed up prepared in the lower case (11a). Here, as shown in the figure, the case (11) shows the structure where the lower case (11a) and cover



(11b) consist of integrated. But the present invention is not restricted to this. It can be done by the structure in which the lower case and cover are separated. The lower case and cover are independently made by using the polymer resin etc. in this case. After the battery cell (20) is inserted and the case is assembled, it thermally fuses with the ultrasonic melting etc. and the case is sealed hermetically. And in the membranous polymers resin is the technical field of the present invention, generally it can be used without limit if it can be used.

Fig. 2 schematically shows the plane view of the lithium secondary battery of fig. 1. As shown in Figure 2, it is sealed up in the battery cell (20) silver case (11) and it is connected to another cord of both sides of the case (11) by the medium of the anode terminal (29) and cathode terminal (31) to the external circuit.

In the lithium polymer secondary battery according to one side of the present invention as described above is the technical field of the present invention, generally it can be manufactured by the manufacturing process of being used. But as an example, as shown in figs. 3a through 3h, it can be manufactured by the following step.

The figs. 3a through 3h shows in order to illustrate the manufacturing process of the lithium secondary battery according to one side of the present invention as the single step. Here, the same reference numeral indicates the same member doing the same function in the before illustrated drawing.

Firstly, the electrode plate is made.

As shown in figs. 3a and 3b, the current collector (41) consisting of aluminium, and the zinc or the copper coil is prepared for and the electrode active material layer (43) is coated on single-side or both sides of the current collector (41) and the electrode plate (47) is made. Here, it leaves the extra column so that the electrode tap be formed and it coats the electrode active material layer (43) and the edge of the current collector (41) manufactures the electrode plate (47).

And then, the edge of the current collector (41) is punched and a plurality of electrode taps (45) is formed predetermined. (refer to Figure 3c)

Next, as shown in figs. 3d and 3e, it does so that it become the unit electrode board in which the separator (49) is laminated in the up down two sided side of the electrode plate (47) and which cuts in the predetermined size and having one electrode tap (45).

As described above, according to the manufacturing process of the electrode plate (47) in which the electrode tap (45) is formed, the negative plate (22) as illustrated in Figure 1 and anode plate (21) are manufactured. As shown in Figure 3f, the anode plate (21) and negative plate (22) are laminated in the mutual alternative in order to be insulated with the separator (23). Here, the cathode tab (27) of the negative plate (22) and cathode tab (25) of the anode plate (21) are not mutually overlapped. In order that the cathode tab (27) is positioned in the other cord of the other side of the cathode tab (25), it is each located in the other side of the case (11) so that it become the fig. 2 or 4a or the structure of terminal as illustrated in Figure 4d and it is laminated.

And then, as shown in Figure 3g, in order to adhere the cathode tap group consisting of the cathode tab (27) and the group of anode tab consisting of the cathode tab (25) closely to the inner side of the case (11) illustrated in Figure 1 it curve-cuts and the energy density per the unit volume is to maximum.

And if the bend of the tap is completed, the anode terminal (29) and cathode terminal (31) are welded in the cathode tab (27) and cathode tab (25) and it connects.

If the task as described above is completed, the battery cell (20) is inserted into the receiving portion (12) of the lower case (11a) as illustrated in Figure 1 and the lithium polymer secondary battery (10) is manufactured after activation, the hermetic sealing and formation etc.

The figs. 4a through 4d schematically shows the plane view of the lithium secondary battery according to another preferred embodiment of the present invention.

As shown in the figure, in the lithium secondary battery (10) according to the preferred embodiment of the present invention is the punching operation (refer to Figure 3c), the cutting operation (the drawing 3d, refer to Figure 3e) or the lamination work (refer to Figure 3f) etc, the anode terminal (29) and cathode terminal (31) can obtain the layout structure of the respective positioned terminal in the other side of the case (11) if the arrangement of the electrode tap (45) is appropriately controlled. Moreover, it is possible that the shape of the electrode terminal itself is altered and the electrode terminal described in the above is located in the other side of the case.

Effect of Invention(Device)

The lithium polymer secondary battery of the present invention can obtain the effect as follows the description described in the above.

In the conventional lithium secondary battery, 100 among 3 is and in the inferiority rate by the short circuit of the electrode terminal, about 3% is. In order to remove the like that with the Yang SanSi of the lithium secondary battery inferiority, remodeling or the replace of the existing production line is needed. And for the safe handling of the produced lithium secondary battery, it need the separate manager tool or all sorts facility. But according to the production of LPB, while effectively utilizing the existing facility, the fault generation by the battery short is minimized and the reliability can be secured. Therefore, remodeling or the change of the production line as described above, and the separate manager tool or facility is not needed.

Scope of Claim(s)

Claim [1]

The lithium polymer secondary battery equipped with the battery cell, the case sealing the battery cell hermetically of the angular type, and the anode terminal for connecting the anode plate to the external circuit and the cathode terminal for connecting the negative plate to the external circuit that places separator in interval and the anode plate and negative plate is laminated, wherein the anode terminal and cathode terminal are arranged in the other side of the respective case.

Claim [2]

The lithium secondary battery of claim 1, wherein the anode terminal is arranged in one side of the case; and the cathode terminal is arranged in the side of the case which is adjacent to the side in which the anode terminal is arranged.

Claim [3]

The lithium secondary battery of claim 1, wherein the anode terminal is arranged in one side of the case; and the cathode terminal is positioned in the opposite face of the side in which the anode terminal is arranged.

Drawing

Drawing(s)

Drawing









